

## ABSTRACT

The present invention provides a means to implement amplitude and phase modulation digitally and directly at an RF frequency that benefits from high output power without the use of amplifiers. This is accomplished by the combination  
5 of two varying amplitude and phase vectors. A reference oscillator produces a carrier signal, which is supplied to two digital delay lines composed of a sequence of delay banks. The delay lines are controlled by lookup tables that are updated by the vector control circuit, used to determine the delay of each digital delay line. The output of each delay line is multiplexed to a switching bank which is also controlled  
10 by the vector control circuit. The output of the switching bank, in combination with a summer, is used to produce discrete amplitude adjustment of the vector. The delay of the lines and the summation adjustment are set in such a way as to produce two vectors with the desired phase shift and magnitude the summation of these two vectors produces a resultant vector with the desired phase and amplitude  
15 characteristics.